Testing of a Long-Term Solution for Low-Level 1,2,3-TCP in A Deep Aquifer Using Colloidal Activated Carbon with Monitoring Natural Attenuation

Andrew Kiggen (akiggen@regenesis.com) and Chris Lee (clee@regenesis.com)
(REGENESIS)

Background/Objectives: 1,2,3-TCP (TCP) is a contaminant known to the government, private sector and other parties as toxic. It is a persistent pollutant in groundwater and has been classified as “likely to be carcinogenic to humans” by EPA (EPA 2009). Although TCP has known mechanisms for completely reducing to non-detect (through research papers), addressing contaminant levels at parts per billion concentrations can be difficult. With the current remedial objectives being health based screening levels, achieving complete reduction from typical remedial methods can leave sites open for decades. Applying a colloidal activated carbon (CAC) can help to achieve remedial goals and assist in monitored natural attenuation.

Approach/Activities: Information will be presented from a bench study, design verification, and a pilot application. Results of bench study indicated TCP was fully sorbed using CAC. The bench study documented that CAC could be effective at this project site. Further site-specific info was gathered during the design verification phase. A contaminant mass flux study, soil grain size analysis, and background groundwater chemistry provided the backbone for the pilot test design. The pilot test included dedicated injection wells to install the CAC in an aquifer in excess of 100 feet below ground surface. Information from a CAC field application and the results of performance monitoring will be presented.

Results/Lessons Learned: This study details the process from initial bench study through pilot test application. The flux meter study had difficulty quantifying the TCP mass flux; however, the flux meter study demonstrated many consistencies with the grain size analysis and the target zone uniformity. This information informed on the deep injection well design and product application. Performance data demonstrates how CAC along with MNA can provide a long-term solution to treat TCP. Based on estimated sorption rates, the treatment longevity is estimated to last in excess of 30 years.